The range of alternatives considered in this Environmental Impact Statement (EIS) was developed though the NEPA public and agency involvement process. The alternatives considered include improvements to the existing roadway system as well as improvements to other non-roadway transportation systems that may help relieve the congestion associated with the roadway under study. Alternatives that do not meet the purpose and need for action are not considered reasonable and therefore do not need to be considered in detail. All alternatives are considered viable until they are dismissed through the alternative evaluation process.

Alternative development starts with the initial development and evaluation of alternatives and ends with a decision on which alternatives are carried forward for detailed evaluation. The three-step alternative decision process is shown in Figure 2.1 and described in the following sections. The sections describe the process that was used to develop alternatives to consider, the alternatives that satisfied the project's purpose and need and therefore were evaluated further, and the alternatives that were dismissed because they did not meet the purpose and need.

2.1 STEP 1 – INITIAL ALTERNATIVE DEVELOPMENT

A project team was established at the onset of the project to help guide the direction of the project and to make key decisions throughout its development. The project team consisted of representatives from UDOT and FHWA and the consultant team.

A comprehensive list of alternatives, sorted by category, was developed through the public and agency scoping process (see Chapter 8–Comments and Coordination) and during the EIS alternative development process. The alternative development process started with a meeting at which the project team identified potential alternatives to be evaluated. An agency scoping meeting was held with all concerned agencies to determine the involvement of other agencies and to identify what concerns they had that should be evaluated as part of this project development. No other agencies expressed a concern to be involved in this project on a continuous basis. A similar meeting was held with the cities along the corridor to explain to them what the project was about. All the cities were anxious to be involved in the project and to provide input.

Similarly, a public scoping meeting was held to get the public's input into what problems exist along Riverdale Road and what improvements should be done to improve the flow of traffic on Riverdale Road. People were asked to express their interest in participating on a Citizen Action Committee (CAC). The members of the CAC would consist of stakeholders, public officials, and the general public. Based on the interest shown at the meeting, the project team decided that the public input could be solicited successfully without the formation of a CAC.

The focus of these meetings was to develop alternatives that helped solve traffic congestion, progression, and safety problems along the 3.7-mile segment of Riverdale Road. A comprehensive list of alternatives, sorted by category, was developed during these scoping sessions. These alternatives are described below.

2.1.1 Alternative Transportation Measures

Alternative transportation measures to reduce congestion were considered. The evaluated alternative transportation measures are:

- Increased Bus Service Alternative
- Transportation System Management/Transportation Demand Management Alternative (TSM/TDM Alternative)

2.1.2 Build Alternatives

Build alternatives consider adding capacity, system enhancements, and construction of alternative measures to reduce congestion. The build alternatives are:

- Lane Addition Alternative
- Light Rail Alternative
- Riverdale Road Expressway Alternative

2.2 STEP 2 – INITIAL ALTERNATIVE SCREENING

The alternatives were analyzed using year 2030 traffic volumes through a series of quantitative techniques including the WFRC regional travel demand model, a customized Synchro traffic engineering model, and a SimTraffic simulation of the operations on Riverdale Road. This series of traffic analyses brought increasing refinement and acted as a series of filters by which certain alternatives were eliminated based on regional analysis while other alternatives were carried progressively further for additional traffic analysis.

As each alternative was developed, the traffic analysis was performed to determine if the purpose and need objectives were met. The initial screening criteria required that each alternative demonstrate the ability to reduce congestion by providing a future roadway level of service (LOS) of LOS D or better. (See Section 1.2.2–Capacity/Transportation Demands for an explanation of level of service.) If an alternative failed to provide the minimum acceptable LOS, additional improvements were considered. The final check included development of a detailed traffic simulation model to determine if traffic operations along the corridor were acceptable.

As each of the alternatives was studied, the project team met to discuss the findings of the analysis and discuss which alternatives should be further studied. The alternative selection process was based on identifying alternatives with the least amount of impacts and adding necessary spot improvements or system enhancements to meet the project's purpose and need. A summary of the initial alternative screening process follows with evaluation of the No-Action Alternative.

2.2.1 No-Action Alternative

The No-Action Alternative consists of doing nothing at this time. No construction would be done except for routine maintenance. With no improvements, five intersections would fail (LOS F) and one would be at capacity (LOS E) as shown previously in Table 1.4–Existing and 2030 No-Action LOS.

2.2.2 Alternative Transportation Measures

2.2.2.1 Increased Bus Service Alternative

The Utah Transit Authority (UTA) currently has five transit routes that cross Riverdale Road. The five routes (70, 72, 610, 640, and 651) use the existing park-and-ride lot at 3600 S. Wall Avenue, which averages 40 parked vehicles per day. UTA was contacted regarding future plans for bus routes along Riverdale Road. No additional bus services are planned in the immediate future for this area. Bus service along Riverdale Road is part of UTA's regional bus plan. The focus of the regional plan is to increase the frequency of service and add additional bus routes as warranted. The Increased Bus Service Alternative would entail increasing the frequency of existing bus routes as well as adding additional service routes along Riverdale Road as warranted.

This alternative promotes transit ridership and is consistent with UTA's long-range plan. Table 2.1 illustrates the Increased Bus Service Alternative travel model results on Riverdale Road compared to the No-Action Alternative.

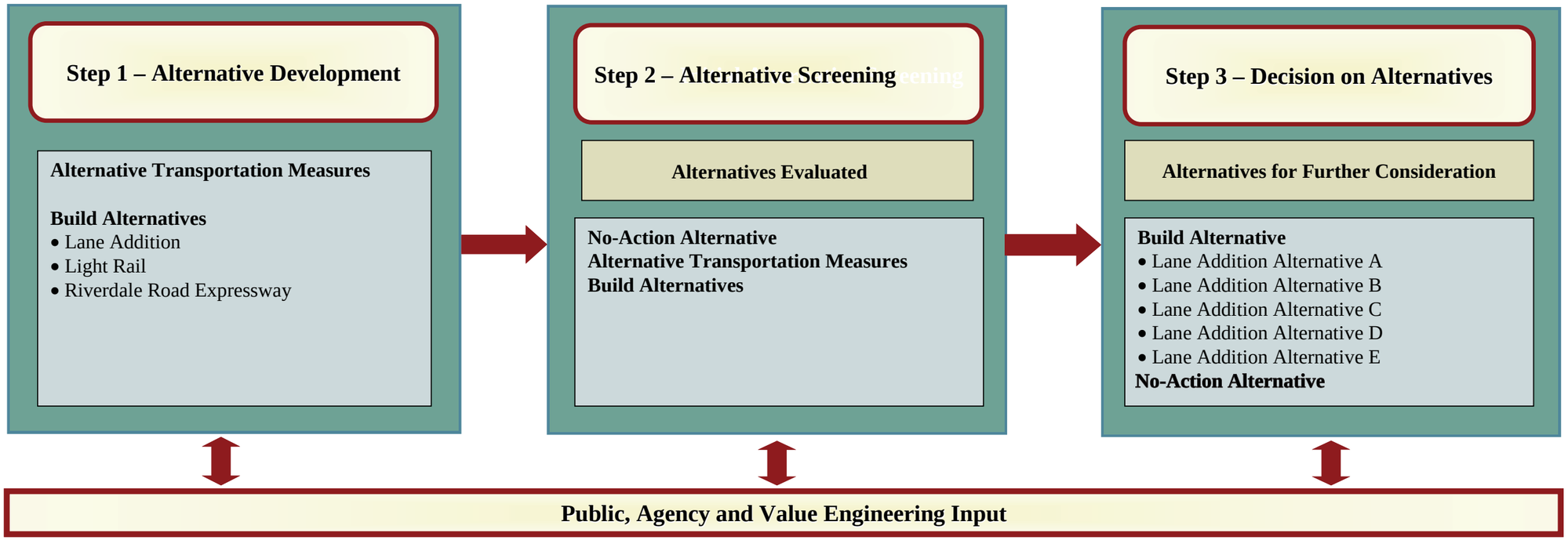


Figure 2.1–Three-Step Alternative Decision Process.

Table 2.1–Riverdale Road Daily Traffic Volumes with Increased Bus Service.

Segment	2030 No-Action	2030 with Increased Bus Service
1900 West to I-15	33,400	33,050
I-15 to I-84	48,000	47,325
I-84 to 1050 West (SR-60)	53,100	49,700
1050 West to 300 West	57,200	56,200
300 West to 40th Street/Wall Avenue	57,300	54,900
40th Street/Wall Avenue to Washington Boulevard	25,900	24,550

Total traffic reduction on Riverdale Road would be as much as 3,400 vehicles per day with increased bus service. Due to the nature of the arterial and traffic forecasting (and rounding), the number of trips would still not be reduced enough to have a positive effect on traffic volumes during peak-hour travel periods (generally it is assumed that about 10% of daily traffic volumes comprise the PM peak-hour traffic volumes). Table 2.2 shows the LOS for the Increased Bus Service Alternative.

Table 2.2–2030 Increased Bus Service Alternative LOS Summary.

Intersection Location with Riverdale Road	PM Peak Hour LOS
1900 West (SR-126)	F
1500 West	F
I-84 Eastbound Ramp	C
I-84 Westbound Ramp	C
1050 West (SR-60)	F
900 West	C
700 West	E
500 West	F
300 West	F
RC Willey/ShopKo	B
40th Street/Wall Avenue (SR-204)	C
Chimes View Drive	C
36th Street	C
Washington Boulevard (US-89)	D
Eastbound Arterial LOS Summary (LOS/Speed)	**F/11.4 mph**
Westbound Arterial LOS Summary (LOS/Speed)	**E/14.9 mph**

As a stand-alone alternative, the Increased Bus Service Alternative would not adequately relieve future traffic congestion along the corridor. The operational analysis determined that five intersection locations would have a failing LOS F and one would be at LOS E resulting in poor travel speeds with slow progression and high delay. The arterial LOS for the corridor is at an unacceptable LOS E. This alternative does not meet all of the purpose and need objectives. This alternative would not provide a LOS D along the corridor in the future or improve safety in high-accident areas. Therefore, the Increased Bus Service Alternative as stand-alone alternative was eliminated from further detailed study.

The Increased Bus Service Alternative has been incorporated into other alternatives. The reduced travel model volumes due to increased bus service were used in evaluating alternatives where the bus service was incorporated.

2.2.2.2 TSM/TDM Alternative

TSM/TDM elements include low-cost items that typically improve the operations of a roadway with only minor roadway construction. These improvements typically consist of providing park-and-ride lots, flexible work schedules, ride sharing, van pooling, and high-occupancy-vehicle lanes without increasing the capacity of the existing roadway.

The WFRC travel model already incorporates the concepts of reducing travel demand by flexible work schedules, ride sharing, and park-and-ride lots; therefore, these elements are incorporated into all alternatives including the No-Action Alternative. Additional park-and-ride lots were not considered viable based on the length of Riverdale Road. Because there are only two lanes in each direction and many intersections, restricting one lane in each direction to high-occupancy vehicles is not viable and was not incorporated into the TSM/TDM Alternative.

The following system enhancements are included as part of the TSM/TDM Alternative:

- **Turn Lanes:** Dedicated right-turn and left-turn lanes would be added to the intersections as shown in Table 2.3.
- **Signal Modifications:** The signals along Riverdale Road would be upgraded to accommodate the new turn lanes. A new signal would be constructed at 500 West when traffic numbers met new signal warrants.
- **Raised Median:** A raised median would be provided along the center of Riverdale Road as shown in Figure 2.2.

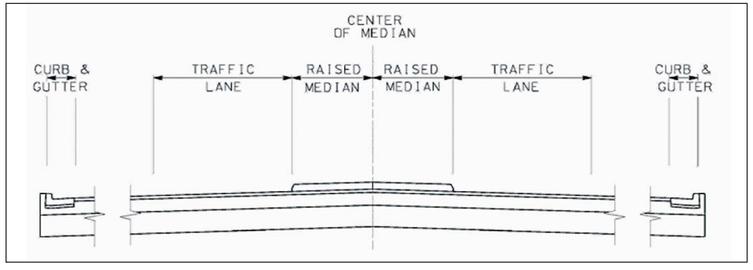


Figure 2.2–Riverdale Road with Median.

With implementation of the TSM/TDM Alternative, the traffic flow along Riverdale Road would improve, but not to the level necessary to accommodate future traffic growth. Analysis of these measures determined that reducing travel demand and implementing travel system improvements, such as turn lanes and signal phasing, improved traffic operations more than the other alternative transportation measures. In addition, increased bus service was included in this alternative to determine if the total combination of these measures would meet the initial screening criteria. The LOS summary for the TSM/TDM Alternative is shown in Table 2.4.

Table 2.3–Proposed Dedicated Right-Turn and Left-Turn Lanes.

Intersection	Riverdale Road				Cross Streets			
	EB		WB		NB		SB	
	L	R	L	R	L	R	L	R
1900 West (SR-126)	1	1	2	1	1	2	2	
1500 West	2	1	2	1	1	1	1	1
I-15				1[a]				
I-84	2	1	2					
1050 West (SR-60)	1		2	1	2	1	1	1
900 West	1	1	1	1	1	1	1	1
700 West	1	1	1		2	1	2	1
300 West	1	1	2	1	2	1	1	2
RC Willey/ShopKo	1	1	1	1	1		1	
40th Street/Wall Avenue	2	1	1					2
Chimes View Drive	1			1	1			
36th Street	1	1	1	1	1	1	1	1
Washington Boulevard	1	1					1	1

[a] Westbound turning to southbound
EB = eastbound; WB = westbound; NB = northbound; SB = southbound
L = left; R = right
1 = One dedicated turn lane; 2 = Dual turn lane

Table 2.4–2030 TSM/TDM Alternative LOS Summary.

Intersection Location with Riverdale Road	PM Peak Hour LOS
1900 West (SR-126)	E
1500 West	E
I-84 Eastbound Ramp	C
I-84 Westbound Ramp	F
1050 West (SR-60)	E
900 West	C
700 West	D
500 West	F
300 West	E
RC Willey/ShopKo	B
40th Street/Wall Avenue (SR-204)	C
Chimes View Drive	C
36th Street	C
Washington Boulevard (US-89)	D
Eastbound Arterial LOS Summary (LOS/Speed)	**E/13.4 mph**
Westbound Arterial LOS Summary (LOS/Speed)	**D/18.0 mph**

The operational analysis for this alternative showed improvements over the No-Action Alternative, but the improvements were inadequate to relieve future traffic congestion along the corridor. The operational analysis determined that two intersections would have a failing LOS F and four locations would be at LOS E, resulting in poor travel speeds with slow progression and high delay. The overall LOS for the urban street corridor remains at an unacceptable LOS E.

This alternative does not meet all of the purpose and need objectives. This alternative would not provide a LOS D along the corridor in the future. Therefore, as a stand-alone alternative, TSM/TDM was eliminated from further detailed study.

The project team incorporated some of the TSM elements into other alternatives as they felt were appropriate.

2.2.3 Build Alternatives

2.2.3.1 Lane Addition Alternative

The Lane Addition Alternative adds capacity to Riverdale Road by increasing the number of through lanes along portions of Riverdale Road. About 2.74 miles (74%) of the total 3.68 miles of roadway would be widened to six lanes. The remaining 0.94 mile of Riverdale Road would not be widened. Figure 2.3 details the extent of the through-lane widening configuration. In addition, shoulders, curb and gutter, and sidewalks would be improved along the entire length of the project.

A preliminary layout of the Lane Addition Alternative showed that, if the standard UDOT shoulder width of 10 feet were used, additional right-of-way (ROW) would be required for the entire length of the project. If the shoulder width were reduced to 4 feet, the additional lanes would fit within the limits of the existing ROW. A design variance was obtained from UDOT to use 4-foot shoulders and 6-foot sidewalks.

Four-foot shoulders would be constructed for the entire length of the project, except at right-turn lanes. Wider eight-foot shoulders would be provided between Chimes View Drive and Washington Boulevard.

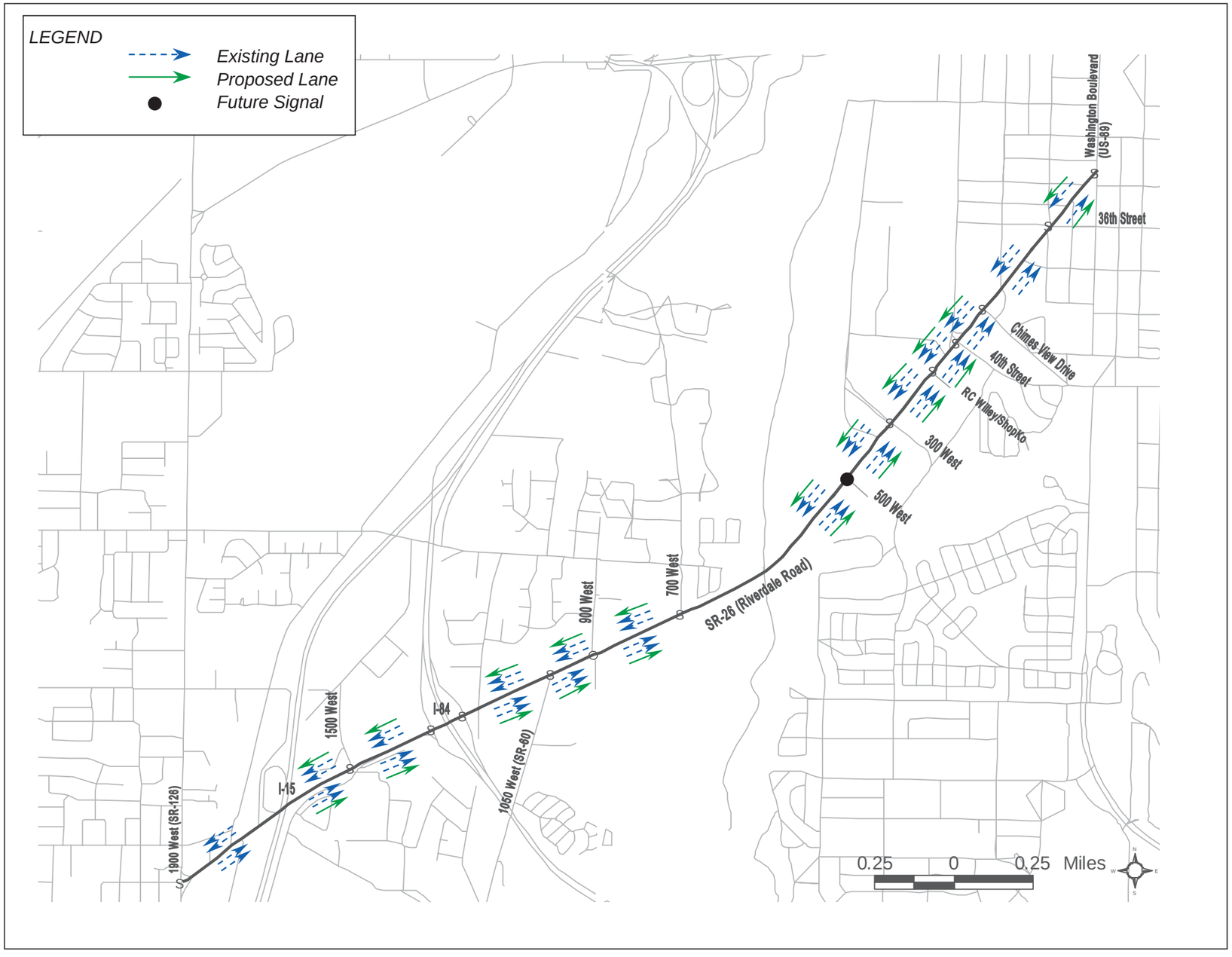


Figure 2.3–Through-Lane Configurations for Lane Addition Alternatives.

Curb and gutter and continuous sidewalks would be provided for the entire length of the project. Between Chimes View Drive and Washington Boulevard, a wider 7-foot sidewalk would be provided. Sidewalk improvements from 1900 West to I-15 are included. Additionally, drainage infrastructure improvements that include an enclosed pipe conduit system with catch basins, and replacing the culvert at Burch Creek with a proposed 8-foot-by-2-foot concrete box culvert, are included in this alternative. This alternative also includes the following system enhancements:

- **Turn Lanes:** Dedicated right-turn and left-turn lanes would be added to the intersections as previously shown in Table 2.3.
- **Signal Modifications:** The signals along Riverdale Road would be upgraded to accommodate the new turn lanes. A new signal would be installed at 500 West in the future after meeting signal warrants.
- **Increased Bus Service:** Bus service would be increased as previously described in Section 2.2.2.1–Increased Bus Service Alternative.

Similar to the No-Action forecasts, traffic volumes for the year 2030 Lane Addition Alternative were developed using the approved 2030 WFRC regional model and socioeconomic forecasts. Figure 2.4 depicts the 2030 PM peak-hour traffic volumes projected for the Lane Addition Alternative for the corridor.

The future traffic operations of this alternative were evaluated for LOS and are summarized in Table 2.5. The operational analysis determined that the Lane Addition Alternative would provide acceptable traffic operations to meet the year 2030 traffic demands. All 14 intersections along the corridor are projected to operate at an acceptable LOS D or better. Similarly, the arterial traffic operations are at equally acceptable levels. The overall LOS will be LOS D for the urban street corridor. This alternative meets the purpose and need of providing LOS D along the corridor in the future, improves safety in high-accident areas, and improves substandard roadway pavement and bridge deficiencies.

The Lane Addition Alternative improves safety and reduces accident potential on Riverdale Road. This alternative restricts access at the interesection of 1150 West to right-in/right-out for westbound traffic. A single-point urban interchange will replace the traditional diamond interchange at I-84. The new interchange has fewer conflict points and can operate more efficiently. Adding two travel lanes will reduce the potential for rear-end-type accidents that result from congestion at overcapacity traffic signals. Long vehicle queues have contributed to increases in this type of accident.

Table 2.5–2030 Lane Addition Alternative LOS Summary.

Intersection Location with Riverdale Road	PM Peak Hour LOS
1900 West (SR-126)	D
1500 West	D
I-84 Eastbound Ramp	C
I-84 Westbound Ramp	B
1050 West (SR-60)	D
900 West	B
700 West	C
500 West	D
300 West	D
RC Willey/ShopKo	B
40th Street/Wall Avenue (SR-204)	C
Chimes View Drive	C
36th Street	D
Washington Boulevard (US-89)	B
Eastbound Arterial LOS Summary (LOS/Speed)	**D/19.9 mph**
Westbound Arterial LOS Summary (LOS/Speed)	**D/20.6 mph**

2.2.3.2 Light Rail Alternative

This alternative considered the option of building a new light rail line along Riverdale Road. A light rail ridership analysis determined that a light rail line from 1900 West to Washington Boulevard was not justified because of a lack of ridership. Instead, the proposed UTA Commuter Rail Project Layton Station was selected as the south terminus. Weber State University was selected as the north terminus. The rail line would be constructed from Layton Station along 1800 North (Clinton Road) to 1900 West. It would continue along 1900 West to Riverdale Road. At this point, it would follow Riverdale Road to 36th Street. At 36th Street, the rail line would go east up 36th Street to the University. Connecting bus service would be provided, or a light rail spur constructed, to connect the Riverdale Road light rail line to the Intermodal Center at Wall Avenue and 23rd Street.

Table 2.6 summarizes the number of trips carried by light rail in Weber County based on the analysis of the Light Rail Alternative. As shown in the table, total transit riders are expected to almost double in the next 30 years while automobile riders are growing at roughly the population rate increase of about 65%. Light rail results in an increase of less than 2,000 transit riders per day. The added traffic congestion resulting from not building Riverdale Road contributes to a small shift from automobiles to light rail.

Table 2.6–WFRC Weber County Transit Mode Shares.

Variable	2000	2030 with Riverdale	2030 without Riverdale	2030 with Light Rail
Automobile Trips	713,122	1,178,917	1,178,898	1,177,149
Light Rail Trips	7,770	14,633	14,665	16,517
Total Transit Share	1.09%	1.24%	1.24%	1.38%
Work Trip Light Rail Share	1.73%	3.29%	3.30%	3.83%

Table 2.7 shows the resulting projected traffic volumes for the year 2030 based on the implementation of the Light Rail Alternative compared to the No-Action Alternative.

Table 2.7–Riverdale Road Daily Traffic Volumes with Rail.

Segment	2030 No-Action	2030 with Rail
1900 West to I-15	33,400	33,300
I-15 to I-84	48,000	47,800
I-84 to 1050 West	53,100	52,900
1050 West to 300 West	57,200	57,000
300 West to 40th Street/Wall Avenue	57,300	56,900
40th Street/Wall Avenue to Washington Boulevard	25,900	25,600

Due to the process of forecasting daily volumes into peak-hour turning movements, there was very little change in the traffic volumes between the Light Rail Alternative and the No-Action Alternative. Therefore, the LOS for the Light Rail Alternative is the same as for the No-Action Alternative. Table 2.8 summarizes the LOS operations of this alternative.

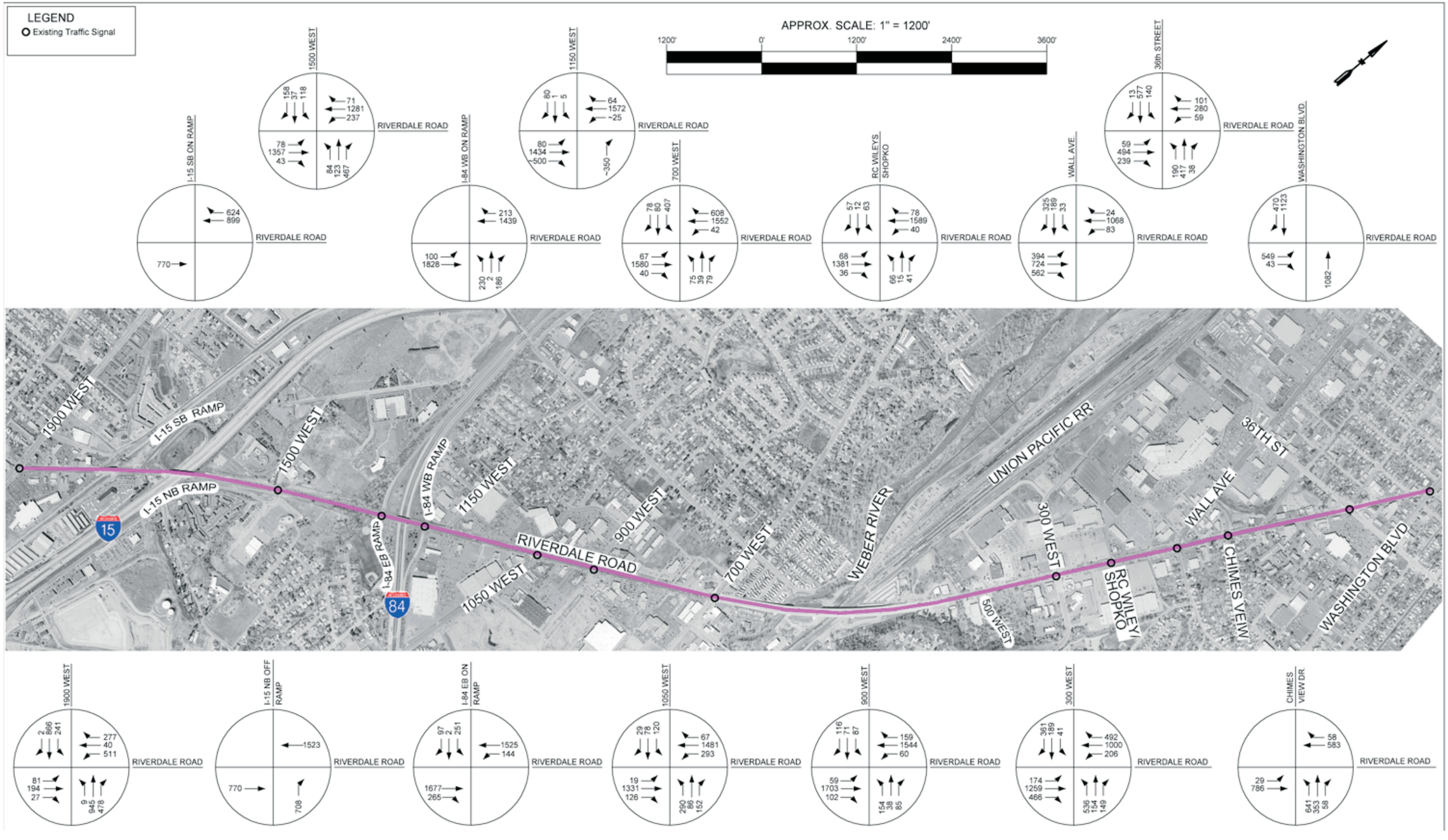


Figure 2.4–2030 Peak-Hour Traffic Volumes for Lane Addition Alternatives.

Table 2.8–2030 Light Rail Alternative LOS Summary.

Intersection Location with Riverdale Road	PM Peak Hour LOS
1900 West (SR-126)	F
1500 West	F
I-84 Eastbound Ramp	D
I-84 Westbound Ramp	C
1050 West (SR-60)	F
900 West	D
700 West	E
500 West	F
300 West	F
RC Willey/ShopKo	B
40th Street/Wall Avenue (SR-204)	D
Chimes View Drive	C
36th Street	D
Washington Boulevard (US-89)	D
Eastbound Arterial LOS Summary (LOS/Speed)	**F/11.3 mph**
Westbound Arterial LOS Summary (LOS/Speed)	**E/15.3 mph**

As a stand-alone alternative, light rail would not adequately relieve future traffic congestion along the corridor. The operational analysis determined that five intersections would have a failing LOS F and one location would be at LOS E resulting in poor travel speeds with slow progression and high delay. The overall LOS for the urban street corridor is at an unacceptable LOS E. This alternative does not meet all of the purpose and need. This alternative would not provide a LOS D along the corridor in the future or improve safety in high-accident areas. Therefore, as a stand-alone alternative, light rail was eliminated from further detailed study.

2.2.3.3 Riverdale Road Expressway Alternative

This alternative consists of constructing a two-lane expressway (one lane in each direction), as shown in Figure 2.5, along Riverdale Road. The Expressway Alternative would consist of building express lanes either below or above the existing Riverdale Road. The express lanes would have to meet the existing roadway grade at the I-84 interchange, or access ramps would have to be provided to maximize the usefulness of the expressway. In addition, the expressway would have to tie into the existing bridge over the Weber River to avoid reconstructing the bridge.

To determine if the Expressway Alternative would meet LOS goals for the project, travel demand modeling was conducted. Travel demand modeling demonstrated that this alternative would relieve traffic congestion on

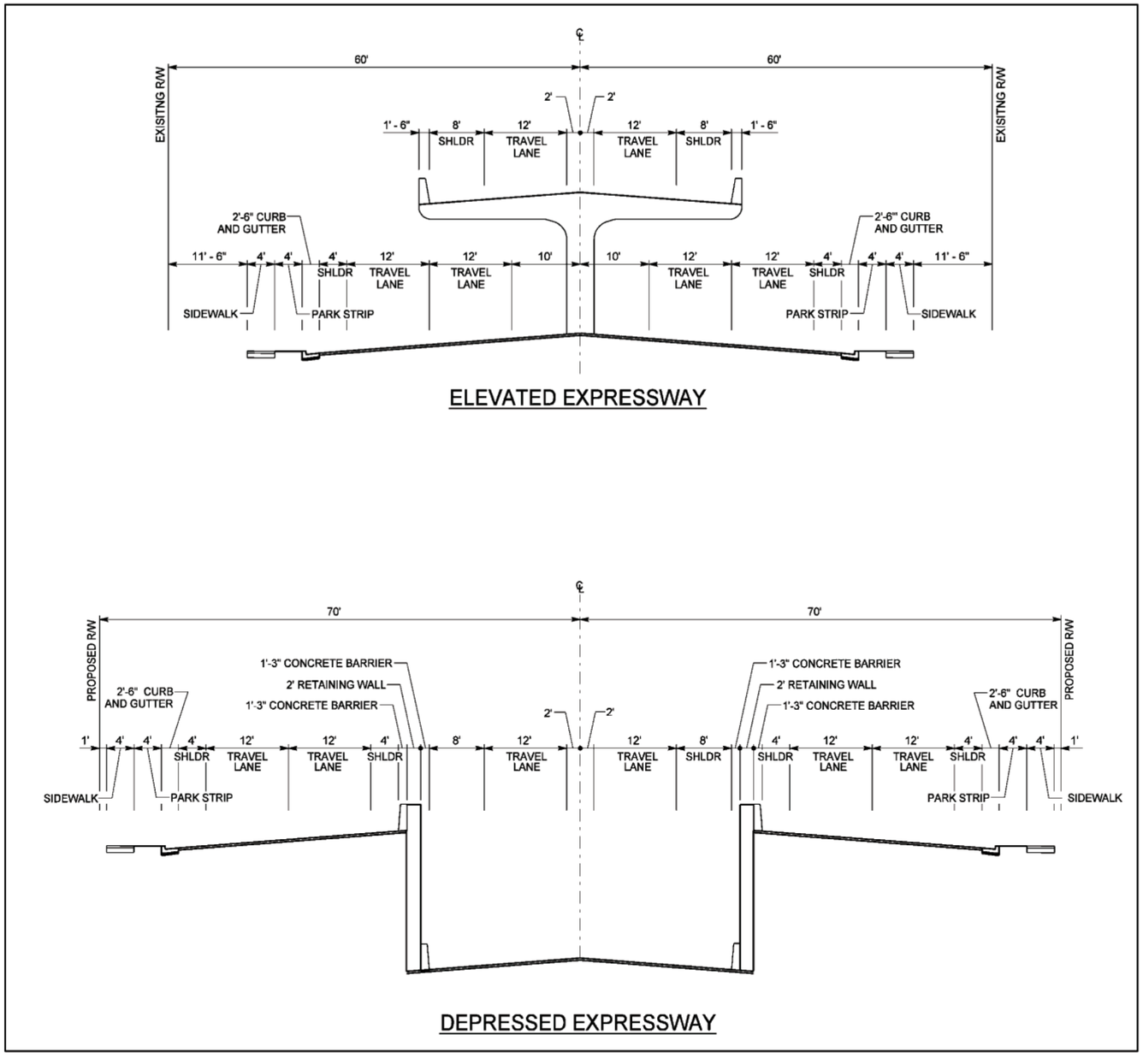


Figure 2.5–Two Lane Expressway Alternative.

Riverdale Road by providing better mobility for through traffic, but congestion would be high at the I-84 interchange. Provided below is a more comprehensive evaluation of the Expressway Alternative and the reasons it was not carried forward for detailed analysis in this EIS.

Depressed Expressway. This alternative would require that the express lanes be depressed within the existing roadway, which would require a total ROW of 140 feet. This ROW width would be 20 feet greater than that for any other alternative evaluated for this project. The extra 20 feet of ROW would result in five to eight Section 4(f) impacts to historic properties and an impact to Golden Spike Park, which is also a 4(f) resource (see Chapter 5–Section 4(f) Evaluation). Given that other alternatives avoid or have fewer 4(f) impacts than the Depressed Expressway Alternative, this alternative was eliminated from detailed analysis.

Elevated Expressway. This alternative would require that the express lanes be elevated about 20 feet above the existing roadway. The ROW requirement for this alternative would be about 120 feet, which would be similar to other alternatives evaluated in this EIS and therefore would have similar 4(f) impacts. However, this alternative was eliminated from detailed evaluation for the following reasons:

- **Constructability** – The project area has a high potential for earthquake activity, so constructing an elevated expressway would create a greater risk of damage during a seismic event.
- **Cost** – Constructing an elevated expressway would substantially increase the cost of the project by providing a continuous two-lane structure for about 4 miles.
- **Community Planning** – The evaluated expressway would not fit within the community plans for Riverdale Road because it would create a visual barrier that would not fit the character of the community.
- **Noise** – An elevated expressway would increase noise along the corridor by elevating the noise source.
- **Safety** – An accident on the elevated expressway would block all traffic in the single travel lane, making it difficult for emergency vehicles to access the accident site. In addition, the area receives about 60 inches of snow a year and subfreezing nighttime temperatures for much of the winter, which would result in icing problems over the 3-mile length of the elevated structure. The icing potential would lead to an increase in accidents or require UDOT to provide more de-icing agents to the roadway, which would increase the potential for water quality concerns.

Based on the above reasons, this alternative was eliminated from detailed study.

2.3 INITIAL ALTERNATIVE SCREENING SUMMARY

The initial screening of alternatives is summarized in Table 2.9. Improvements to substandard pavement and the correction of bridge deficiencies have been included in each of the alternatives. Only the Lane Addition Alternative meets all the purpose and need objectives. The Lane Addition Alternative helps traffic flow on Riverdale Road by providing a LOS D along the corridor in the future, improving safety in high-accident areas, and improving substandard roadway pavement and bridge deficiencies.

Table 2.9–Purpose and Need Criteria Summary.

Alternative	Purpose and Need Elements		
	Provides Acceptable Future Corridor LOS	Improves Safety in High-Accident Areas	Improves Roadway Deficiencies
Alternative Transportation Measures			
Increased Bus Service	No	No	No
TSM/TDM	No	Yes	No
Build Alternatives			
Lane Addition	Yes	Yes	Yes
Light Rail	No	No	No
Riverdale Road Expressway	Yes	No	No

2.4 STEP 3 – DECISION ON ALTERNATIVES

The project team decided which alternatives would be dropped and which alternatives would be evaluated further. The project team based the decision on whether or not each alternative met the purpose and need. A public meeting was held on January 27, 2003, to get input into what alternatives would be evaluated further.

2.4.1 Alternatives Eliminated from Consideration

Based on the results of the initial alternative screening process, the alternatives that failed to meet the purpose and need were eliminated from further consideration. A list of the dismissed alternatives is presented below.

Alternative Transportation Measures

- Increased Bus Service Alternative
- TSM/TDM Alternative

Build Alternatives

- Light Rail Alternative
- Riverdale Road Expressway Alternative

Other Stand-Alone Alternatives

Many different types of transportation solutions or ideas were considered and eliminated during the alternative development process. Other solutions or alternatives that might reduce congestion and meet the purpose and need were considered. These alternatives, which do not fit directly into the categories of alternative transportation measures or build alternatives, included:

- Fully Directional I-15/I-84 Interchange Alternative
- Adams Street Alternative
- 33rd Street and Pacific Avenue Alternative
- Connection from 36th Street to I-15 Alternative
- Riverdale Road and 4400 South One-Way Streets Alternative
- 4400 South and Pacific Avenue Alternative
- Ritter Drive Alternative
- Fully Directional I-15 Interchange

These alternatives did not meet the purpose and need for this project. They may have had isolated benefits, but not to the corridor overall. Some were ineffective transportation solutions. Evaluation of the Other Stand-Alone Alternatives has been documented in the Riverdale Road Traffic Analysis Report.

2.4.2 Alternatives for Further Consideration

2.4.2.1 No-Action Alternative

This alternative fails to satisfy the purpose and need of reducing the future congestion on Riverdale Road by accommodating the projected year 2030 peak-hour traffic volumes at a LOS D or better. However, as required by the NEPA process, the No-Action Alternative was carried forward in Chapter 4–Environmental Consequences as a baseline condition to allow a comparison of the impacts of the other alternatives.

2.4.2.2 Build Alternatives

Build alternatives that met the purpose and need were carried forward for evaluation in Chapter 4–Environmental Consequences. The Lane Addition Alternative was the only alternative that met the initial screening criteria of accommodating the projected year 2030 peak-hour traffic volumes at a LOS D or better, improving safety, and correcting roadway deficiencies.

2.4.2.2.1 Lane Addition Alternative

Because it satisfied the project purpose and need, the Lane Addition Alternative was carried forward into the next level of alternative analysis. This alternative, which has five alignment variations, is further studied in Chapter 4–Environmental Consequences.

The Lane Addition Alternative requires that an additional travel lanes be constructed along Riverdale Road between:

- I-15 and Wall Avenue/40th Street in each direction
- Wall Avenue/40th Street to Chimes View Drive in the westbound direction
- 36th Street and Washington Boulevard in each direction

The proposed roadway sections along Riverdale Road are shown in Figure 2.6. This alternative includes the following items.

I-15 Structure: Based on the Structure Appraisal Rating and discussions with UDOT Bridge personnel, the project team discussed the possibilities of widening I-15 and constructing additional ramps at the interchange to serve the direction of travel that is currently not being served at the interchange. Based on these discussions, the decision was made to construct the new bridge (as shown in Figure 2.7) to accommodate the possible widening of I-15 and construction of additional on and off ramps. Several I-15 interchange configurations were developed to verify that the new structure could accommodate the widening of I-15 and the new interchange ramps.

Single-Point Urban Interchange (SPUI) at I-84: At I-84, a full-movement diamond interchange currently provides access to Riverdale Road. The existing five-lane bridge width over I-84 is insufficient to accommodate the needed eight lanes (six through lanes and two left-turn lanes) proposed by the Lane Addition Alternative. Due to existing ROW constraints and the desire to minimize impacts to adjacent properties, only two interchange types were evaluated at this location. The operational analysis of future-year conditions was performed for both the improved diamond interchange and the SPUI. Table 2.10 summarizes the results of this analysis.

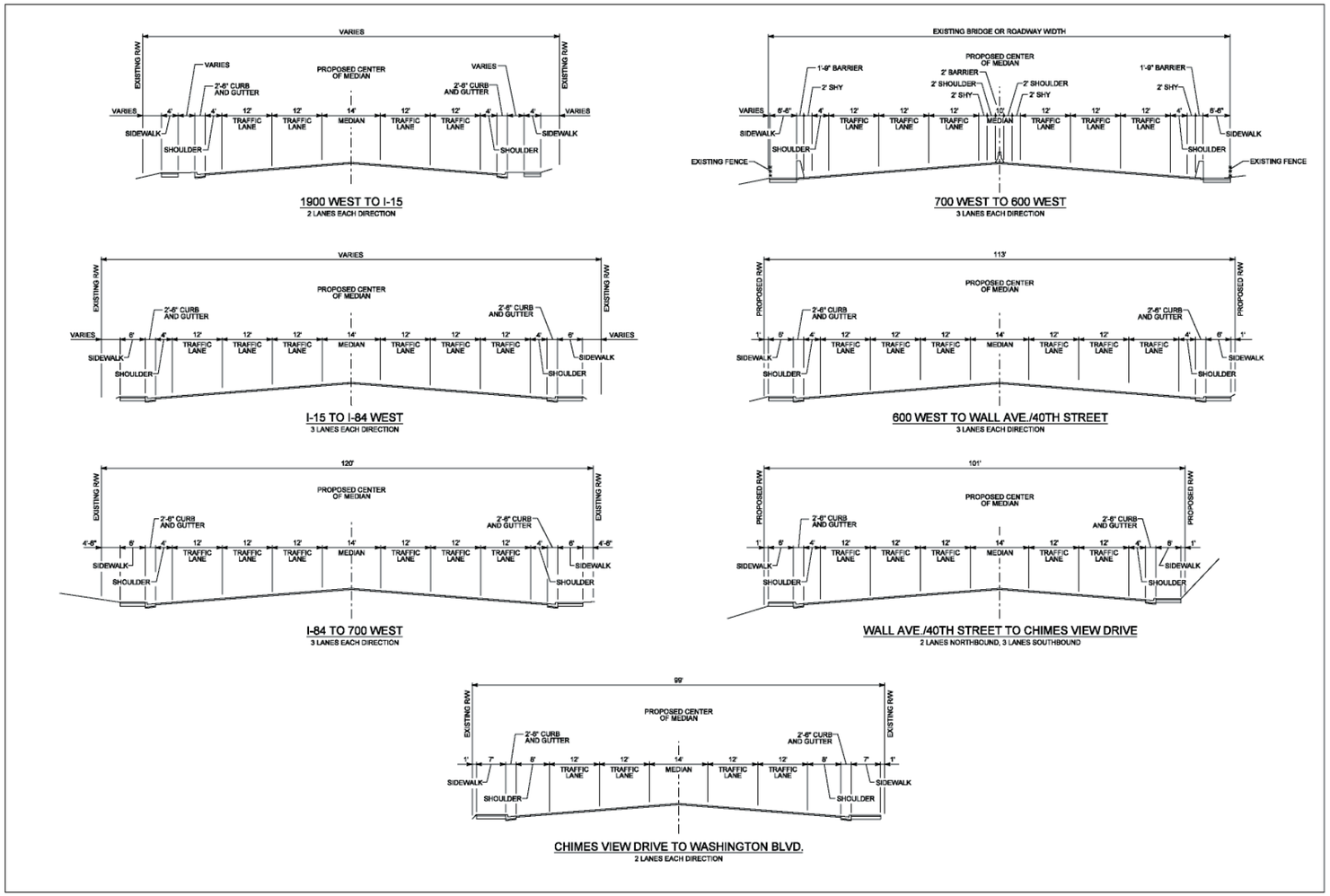


Figure 2.6–Roadway Typical Section for the Lane Addition Alternative.

Table 2.10–Improved Diamond Interchange and SPUI Summary.

Intersection Type	Number of Signals	Overall LOS	Overall Delay (seconds)	Number of Approaches Nearing Capacity
SPUI	1	**B**	19.5	1
Improved Diamond	2	West Signal – **C** East Signal – **B**	West Signal – 33.7 East Signal – 18.5	2

The operational analysis determined that the SPUI would operate more efficiently than an improved diamond interchange by providing a higher LOS. In addition to this benefit, the SPUI has fewer traffic signals, fewer accident-related conflict points, and low gridlock potential. Figure 2.8 depicts the SPUI interchange proposed at this location.

The UDOT Structures Division completed an independent evaluation and determined that it would be more beneficial to replace the entire structure

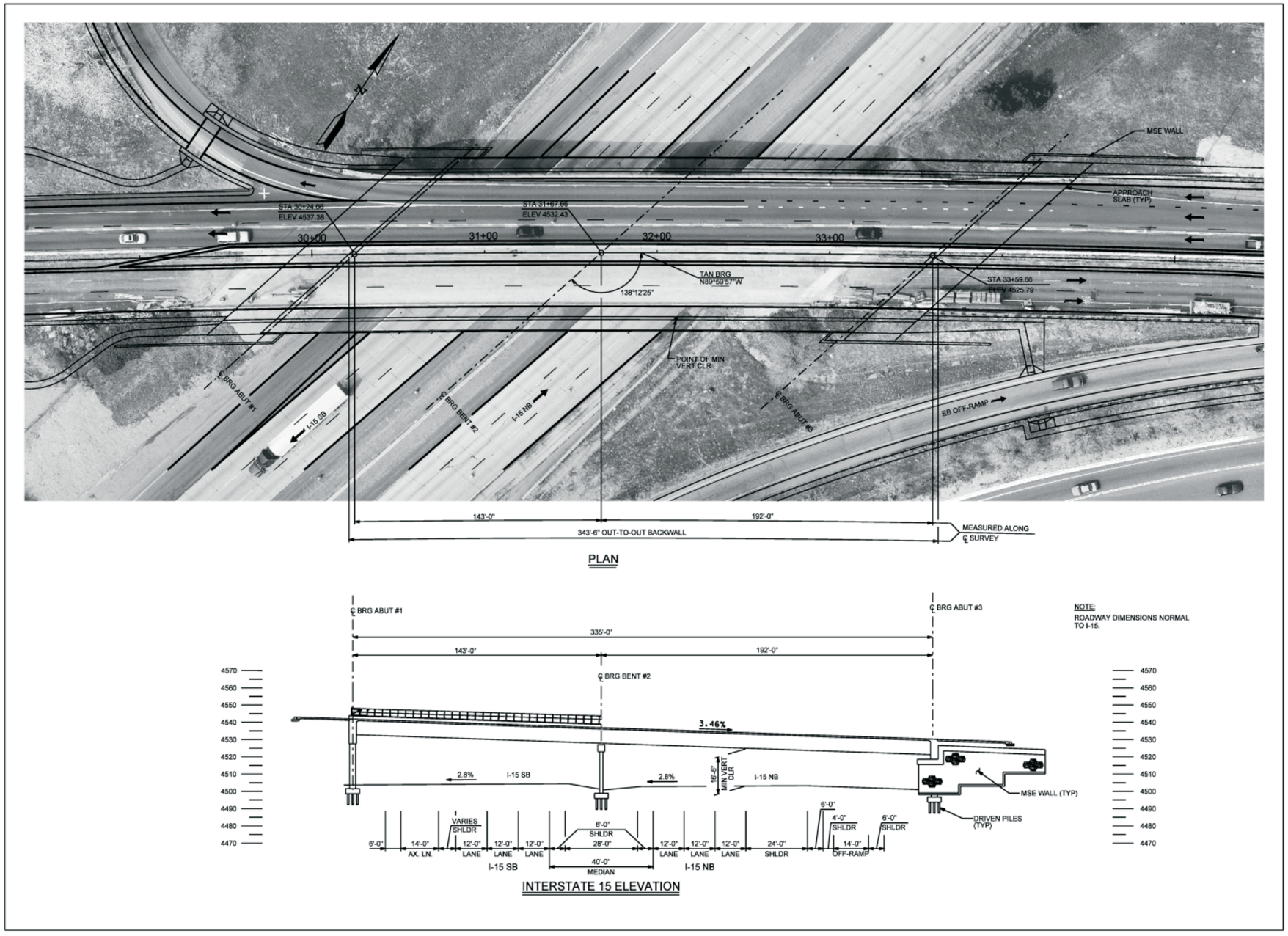


Figure 2.7–Preliminary Layout of I-15 Bridge (Page 1 of 2).

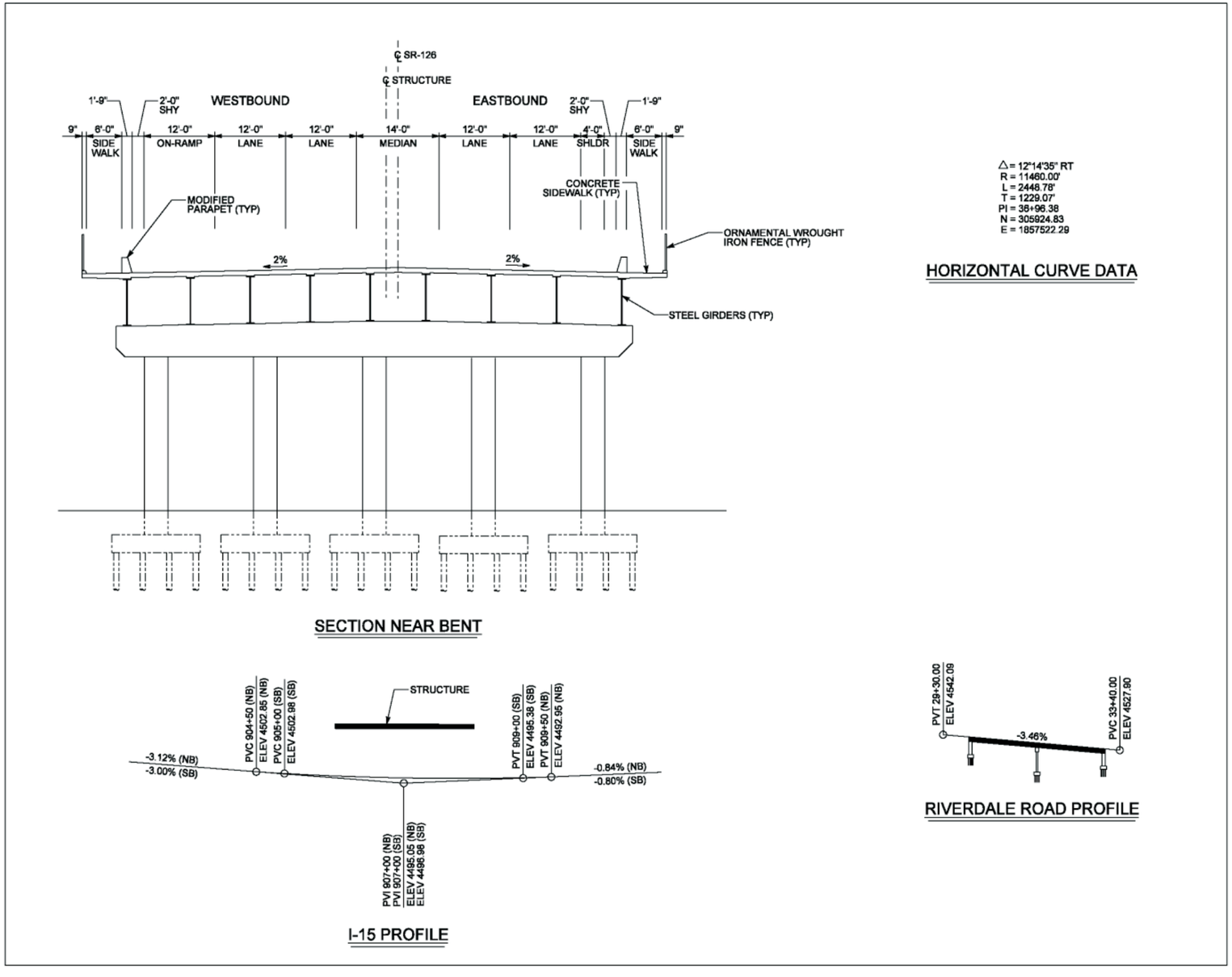


Figure 2.7–Preliminary Layout of I-15 Bridge (Page 2 of 2).

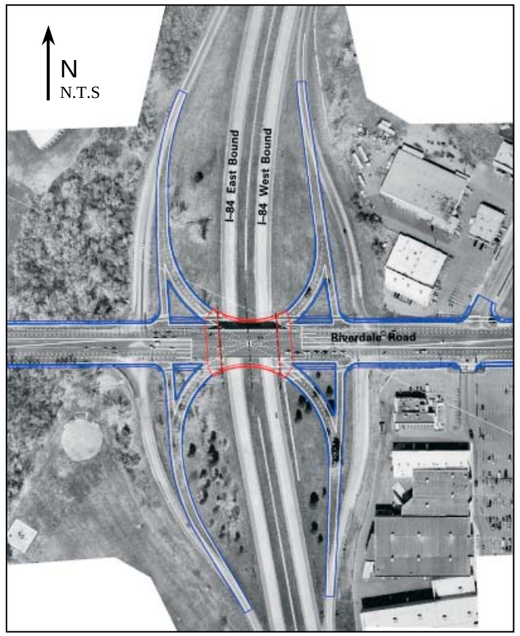


Figure 2.8–Single-Point Urban Interchange at I-84.

rather than to rehabilitate the bridge deck. A feasibility analysis and cost/benefit analysis was performed to determine if the additional operational and safety improvements would justify the cost of constructing a SPUI-type interchange. The feasibility analysis included preparation of a preliminary bridge layout as shown in Figure 2.9 on pages 2.14 and 2.15. The feasibility analysis determined that a SPUI could be constructed at this location.

The cost/benefit analysis considered only the cost difference between reconstructing the bridge to accommodate a SPUI versus an improved diamond interchange. The additional cost for the SPUI was estimated at $1.3 million. The user benefit savings were based on 2030-modeled vehicle-miles of travel and vehicle-hours of travel differences in the region per day between incorporating the SPUI or an improved diamond interchange. These travel parameter results were then converted into monetary values. Vehicle-mile costs were based on the Internal Revenue Service (IRS)–approved travel rate of $0.36 per mile. Vehicle-hour costs were computed from the average vehicle occupancy (1.37 persons per vehicle per day according to the 1993 home interview survey in the region) times the personal value of time ($11.68 per hour per person based on the Utah Governor's Office of Planning and Budget 2002 per-capita income divided by an assumed 40-hour work week). The overall savings were calculated using a 6% discount rate.

The user benefit cost savings of implementing a SPUI are estimated at $3.0 million over the next 20 years. The difference between the structure cost of $1.3 million and the user benefits is $1.7 million. In addition to better operational performance with no additional impacts, the SPUI is the preferred interchange type and has been included as part of the Lane Addition Alternative. Details of the operational analysis have been documented in the Riverdale Road Traffic Analysis Report.

- **Turn Lanes:** Dedicated right-turn and left-turn lanes would be constructed as previously shown in Table 2.3 based on the numerous intersection traffic analyses performed to optimize the LOS.
- **Signal Modifications:** Signals would be upgraded to accommodate the new turn lanes and additional through lanes. A new signal would be constructed at 500 West when UDOT signal warrants are met.
- **Increased Bus Service:** Additional or increased frequency of bus service would be implemented by UTA as warranted.
- **Riverdale Road/1150 West Intersection Safety Improvements:** Changes in access to this intersection are required to improve safety. Access to and from 1150 West would be restricted to right-in/right-out. Left turns from Riverdale Road would be eliminated. Eliminating conflicting turning movements at this intersection would reduce the potential for broadside and approach-turn type of accidents. The potential for safety is increased when accident severity is reduced.

2.4.2.2.1.1 Lane Addition Alternative – Alignment Options

Based on the preliminary layout of the Lane Addition Alternative, ROW would be required between 600 West and Chimes View Drive. Therefore, the project team developed five different alignment options for this section of Riverdale Road to evaluate impacts. The alignment alternatives include the following widening scenarios:

- Primarily to the north of the existing roadway
- Symmetrical around the existing roadway
- Primarily to the south of the existing roadway
- Two options that involved widening to the north and south of the existing roadway in varying amounts

Table 2.11 summarizes the Lane Addition Alternative widening scenarios, and Table 2.12 provides details on the differences between the proposed and existing ROW for each alternative.

Table 2.11–Lane Addition Widening Scenario.

Roadway Segment	Alignment Option				
	A	B	C	D	E
1900 West to I-15 [a]	Symmetrical				
I-15 to I-84 [b]	Symmetrical				
I-84 to 700 West [a]	Symmetrical				
700 West to 600 West [c]	Not Applicable				
600 West to Wall Avenue	North Side	Symmetrical	South Side	South Side [d]	South Side
Wall Avenue to Chimes View Drive	North Side	Symmetrical	South Side	Symmetrical	South Side
Chimes View Drive to 37th South [a]	Symmetrical				
37th South to Harris Street [a]	Symmetrical				South Side [e]
Harris Street to Washington Boulevard [a]	Symmetrical				

[a] The typical section was based on the existing ROW width. Widening the roadway around the existing centerline would require ROW only where additional turn lanes were required. Therefore, only symmetrical widening was considered.

[b] A symmetrical alignment was selected to stay within the existing ROW as much as possible and to align with the roadway sections on either end.

[c] No work is proposed through this segment except for restriping the roadway.

[d] The roadway would be shifted to the south 3.5 feet from the existing centerline.

[e] The roadway was shifted to the south to avoid impacts to a Section 4(f) property due to a right-turn lane.

Table 2.12–Proposed and Existing ROW Differences.

Alternative	Location	Maximum (ft)
Alternative A		
	North Side ROW	+38
	South Side ROW	+6
Alternative B		
	North Side ROW	+26
	South Side ROW	+22
Alternative C		
	North Side ROW	+11
	South Side ROW	+36
Alternative D		
	North Side ROW	+19
	South Side ROW	+26
Alternative E		
	North Side ROW	+19
	South Side ROW	+26

The LOS operations are not affected by the changes in alignment and remain at an acceptable level for all five options.

2.4.2.2.1.2 Lane Addition Alternative A

Between 600 West and Chimes View Drive, the roadway would be widened primarily to the north. Elsewhere the widening would be symmetrical around the existing roadway.

Details of this roadway alignment option are included as Exhibits 4.1 through 4.8 at the end of Chapter 4–Environmental Consequences.

2.4.2.2.1.3 Lane Addition Alternative B

Between 600 West and Chimes View Drive, the widening of the proposed roadway would be symmetrical around the existing roadway. Details of this roadway alignment option are included as Exhibits 4.9 through 4.16 at the end of Chapter 4.

2.4.2.2.1.4 Lane Addition Alternative C

Between 600 West and Chimes View Drive, the roadway would be widened primarily to the south of the existing roadway. Details of this roadway alignment option are included as Exhibits 4.17 through 4.24 at the end of Chapter 4.

2.4.2.2.1.5 Lane Addition Alternative D

Between 600 West and Chimes View Drive, the widening of the proposed roadway would be on both sides of the existing roadway with a slight shift to the south. Details of this roadway alignment option are included as Exhibits 4.25 through 4.32 at the end of Chapter 4.

2.4.2.2.1.6 Lane Addition Alternative E (Preferred Alternative)

Between 600 West and Chimes View Drive, the widening of the proposed roadway would be on both sides of the existing roadway with a slight shift to the south. Between Chimes View Drive and 37th Street, the widening of the proposed roadway would symmetrical around the existing roadway. Between 37th Street and Harris Street, the proposed roadway would be on both sides of the existing roadway with a slight shift to the south. Details of this roadway alignment option are included as Exhibits 4.33 through 4.40 at the end of Chapter 4.

2.4.3 Basis for Selecting the Preferred Alternative

Lane Addition Alternative E was selected as the Preferred Alternative for the Riverdale Road project. The Preferred Alternative would include reconstructing the I-84 interchange and may include reconstructing the ramps and bridge into a single-point urban interchange or similar type of interchange. The I-15/Riverdale Road interchange bridge would also be reconstructed. All of the build alternatives carried forward for detailed study would result in the same improvement to transportation mobility, safety, and roadway deficiencies. Therefore, the main reasons for selecting Lane Addition Alternative E as the Preferred Alternative are as follows:

- **Section 4(f)** – Lane Addition Alternative E was the only alternative to result in one 4(f) use, which was considered a *de minimis* impact by FHWA (that is, the impact would be too minor to require action).
- **Relocations** – Lane Addition Alternative E was the only alternative to have no relocations.
- **Cultural Resources** – Lane Addition Alternative E was the only alternative to result in no adverse effects to cultural resources.

With the exceptions of 4(f) impacts, relocations, and impacts to cultural resources, all of the build alternatives carried forward for detailed study would have similar environmental impacts.

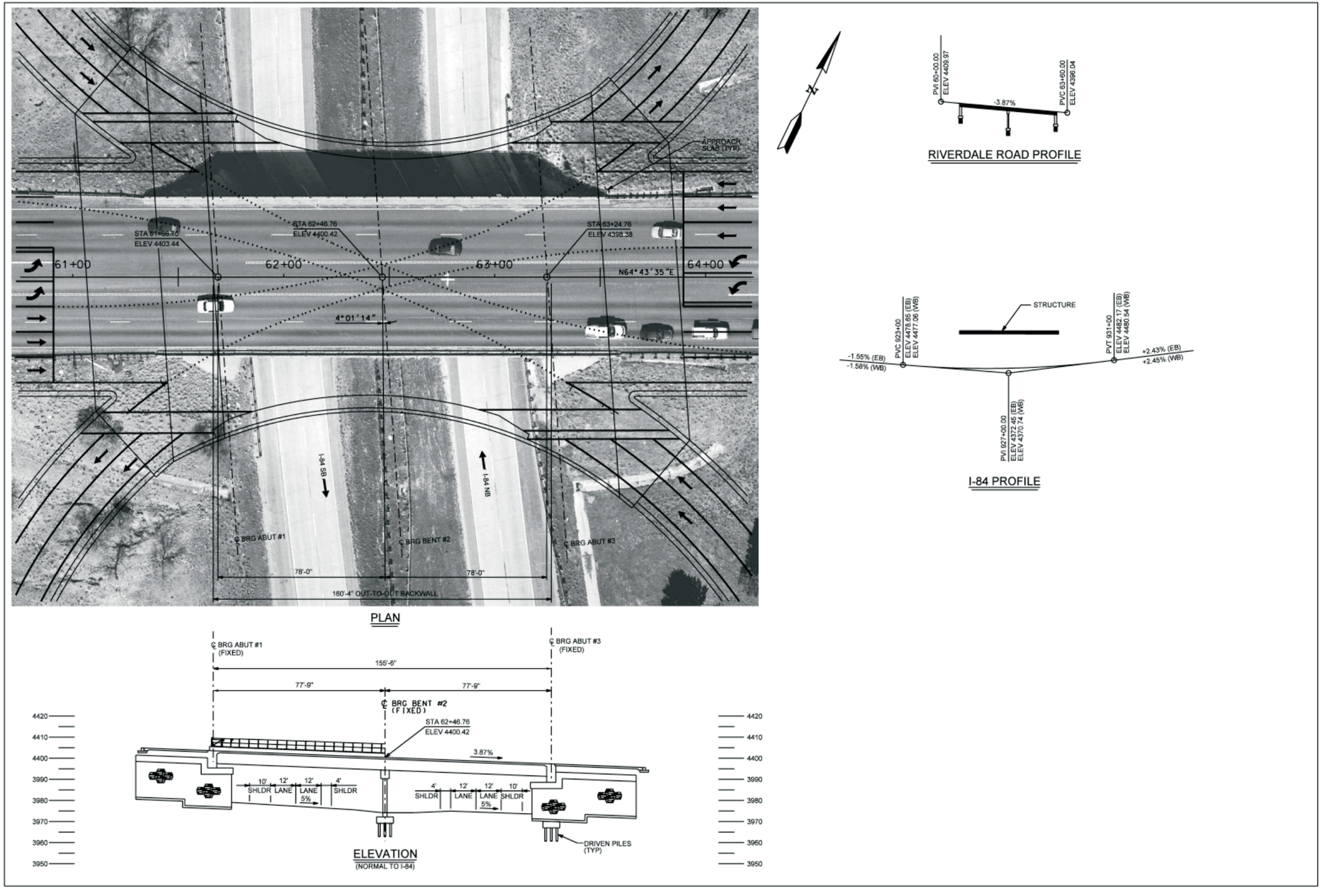
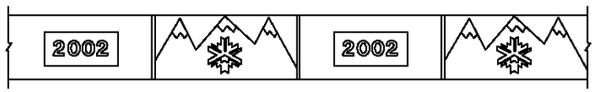
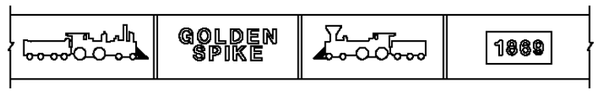


Figure 2.9–Preliminary Layout of I-84 Bridge (Page 1 of 2).

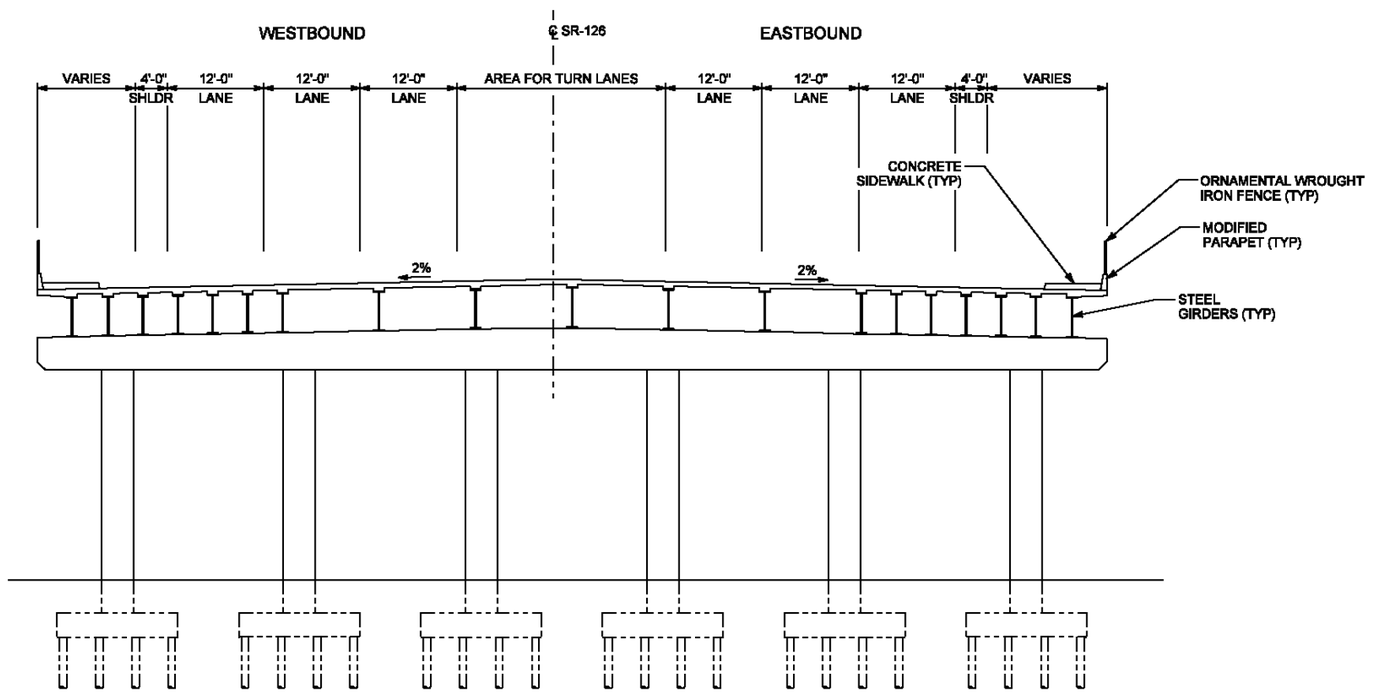


OLYMPIC PARAPET DETAIL

SIMILAR TO DESIGN ON
I-15 - BANGETER INTERCHANGE



RAILROAD PARAPET DETAIL



SECTION NEAR BENT

Figure 2.9–Preliminary Layout of I-84 Bridge (Page 2 of 2).

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